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ABSTRACT

Three nonprofessionals, including those with limited education and advanced age, received training to become effective behavior modification agents (therapists). Each was then individually observed and videotaped in his work with a retarded child. Therapists' performances were not adequate for effecting the desired changes in the childrens' behavior. A subsequent videotape-feedback training program resulted in improvements in both therapist and child behaviors. These were maintained even after the training condition was withdrawn. Based on these positive results, 3 mothers were similarly trained to work with their own young children. A major point revealed in this investigation is that it does not suffice merely to present the nonprofessional therapist with a behavior modification program and an injunction to carry it out. Explicit, detailed training and close scrutiny are required for providing a wide range of nonprofessionals with behavior modification skills. (Author/TL)

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A VIDEOTAPE-FEEDBACK TRAINING METHOD TO TEACH BEHAVIOR MODIFICATION SKILLS TO NONPROFESSIONALS[1]

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University of Utah and Eastern Washington State College

Many schools and treatment centers are now using nonprofessional workers to administer behavior modification programs for children (Guerney, 1969; Tharp and Wetzel, 1969). There is an obvious economic advantage in the use of nonprofessional personnel; several nonprofessionals can be hired for the price of one fully qualified psychologist. But do the nonprofessionals really replace the more highly trained persons? Despite the popularity of the use of nonprofessionals, for the most part only anecdotal accounts are available to testify to their skill in conducting behavior modification programs. Accordingly, one goal of the present project was to assess the performance of behavior modification agents (therapists) who (1) have had a brief introduction to behavior modification principles and techniques, and (2) have received minimal subsequent supervision in their work with individual, developmentally retarded children (baseline condition).

A second goal was to develop a training program to optimize the therapists' performance. Feedback regarding their own behavior has been found to reinforce use of appropriate behavior modification techniques by attendants working with institutionalized, retarded children (Bricker, Morgan, and Grabowski, 1968; Panyon, Boozer, and Morris, 1970). Consequently, our program consisted of giving therapists detailed feedback concerning the appropriateness of their performance. Therapists were videotaped as they conducted daily sessions with individual, developmentally retarded children. Immediately following each session, the therapist was shown her videotape

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and her performance was discussed with her (feedback condition). This procedure tested the effects of daily feedback and discussion on therapists' performance.

A third aim of the present project was to see whether the therapists' use of appropriate behavior modification techniques would be maintained when the videotape playbacks and discussion sessions were withdrawn (post feedback condition). Finally, the feedback procedure was used to train three mothers to conduct individual tutoring sessions with their own developmentally retarded children.

Study I. Effects of Videotape Feedback on Therapists' Performance

Subjects

The research took place at the Behavior Modification Training Center, Salt Lake City, Utah, a day care facility providing behavior modification programs for behaviorally disturbed, brain-damaged, and developmentally retarded children. Subjects were volunteers and paid nonprofessional personnel who worked with the children in ongoing behavior modification programs at the training center. Both the therapists and the children were chosen for participation in this study on the recommendation of the director of the training center.

Therapist A and Child A. Therapist A was a woman beyond retirement age participating in the Foster Grandparents Program at the Training Center. The Foster Grandparents Program is a demonstration project to give employment to low income persons over the age of 60, and is sponsored by the Office of Economic Opportunity and the Administration on Aging of the U.S. Department of Health, Education, and Welfare. This program provides a source of older persons to function as paraprofessional personnel and aides in various capacities in day care and custodial centers throughout the Salt Lake area.

Child A was a 4 yr. old male variously diagnosed as brain damaged, autistic, or both. Child A was nonverbal, lacked imitative behaviors, and engaged in a variety of self stimulatory, perseverative behaviors. His ongoing tutoring program was designed to develop specific gross motor imitative behaviors (e.g., clapping, slapping the table), by consequating imitative responses with spoonfuls of baby food paired with praise occasionally accompanied by a pat on the cheek.

Therapist B and Child B. Therapist B was also a woman beyond retirement age participating in the Foster Grandparents program. Child B_1, a 3-1/2 yr. old Mongoloid female, was nonverbal and wore a hearing aid to correct for hearing loss, but she possessed a wide range of imitative motor behaviors. This child was engaged in a program designed to develop imitation of basic speech sounds (e.g., "Mmm", and "Mama"). Her imitative responses were consequated with candy (M-and-M's) or sips of juice paired with praise ("Good girl") occasionally accompanied by a pat on the cheek. Child B_1 left the institution prior to completion of the program. Therapist B was then observed in an already ongoing behavior modification program with another child, B_2, initiated by another therapist. Child B_2 was a 4 yr. old male who imitated motor movements, and had a small vocabulary of single words. This child had moderately severe deficits in vision and hearing, and engaged in a wide variety of inappropriate behaviors. He was placed on a program designed to expand his spoken vocabulary (e.g., "ball", "cup", "baby", "car", "kitty"). His verbal imitative responses were consequated with candy (M-and-M's) paired with praise occasionally accompanied by a pat on the shoulder.

Therapist C and Child C. Therapist C was a 20 yr. old female, undergraduate student who had completed several courses in undergraduate psychology. Therapist C received individual study credit in a university practicum course for her work at the training center. Child C was a 4 yr. old male who spoke a few single words which were often unrecognizable; he had profound visual disabilities, and displayed a number of inappropriate behaviors such as hitting, spitting, yelling, and generally bullying other children (and therapists). This child's program was designed to shape precision of enunciation (e.g., distinct "Ah" and "Mmm" sounds) in order to make his speech more understandable. As in the preceding cases, Child C's verbal imitative responses were consequated with food (spoonfuls of baby food) and praise occasionally accompanied by pats on the shoulder.

Apparatus

Tutoring sessions were videotaped by means of Sony video cameras (CVC-2100A) with zoom lenses (VCL-20) and a videorecorder unit (TCV-2110). This equipment uses 1/2-in. video recording tape. The experimenters, two male psychology graduate students, videotaped the tutoring sessions and conducted the therapist training programs.

Observational Techniques

All tutoring sessions were conducted in 5-ft. x 8-ft. booths adjacent to an observation room which housed the videotaping equipment. Observation windows covered with black screens allowed video taping of the tutoring sessions. Two independent observers, the experimenters, recorded target behaviors during each session.

Therapist behaviors recorded were frequencies of correct and incorrect administration of praise and food consequences, and negative attention, i.e. negative verbal comments, physical restraint, and unprogrammed uses of time

out during the session. Specifically, correct therapist administered consequences consisted of praising and feeding the child whenever the therapist had requested a response and the child had complied. Incorrect therapist administered consequences consisted of the therapist's praising and feeding the child following the child's incorrect response to a programmed therapist request. The therapist could also be credited with incorrect consequation by attending to the child's negative behaviors such as screaming, hitting himself, crying, or refusing to sit in his chair. Thus, in some instances the total therapist behaviors recorded exceed the total child responses recorded. Frequencies of correct and incorrect therapist-administered consequences were converted to proportions by the following formula:

$$\left(\frac{\text{Total correct}}{\text{Total correct + Total incorrect}}\right).$$

Children's behaviors recorded were the frequencies of appropriate responses to the particular program being used. Children's responses were also converted to proportions by the formula: $\left(\frac{\text{Total correct}}{\text{Total correct + Total incorrect}}\right)$. Correct child responses consisted of the child's emitting the imitative behavior specified in his program within three seconds after the behavior was modeled by the therapist.

Interobserver reliability was assessed by comparing for every session the number of observer agreements divided by the number of agreements + number of disagreements for all categories of therapist and child behavior combined. After data collection had been completed an additional measure of observer reliability over time was made by observing replays of 95% of the videotaped sessions and computing reliability by the above method. This review procedure was used to determine whether the scoring criteria used by the observers were changing over time.

Procedure

Baseline Condition. Baseline period consisted of videotaping the daily individual tutoring sessions. Experimenters gave therapists no feedback concerning their performance during the baseline period.

Feedback-training Condition. During this period therapists viewed video replays of their sessions immediately after completion of the session. Experimenters viewed tapes with the therapists and provided praise for appropriate therapist behaviors, ignored non-appropriate therapist behaviors, and instructed therapists in behavior modification techniques as pertinent to the situation, e.g., appropriate use of time outs and extinction procedures in dealing with inappropriate child behaviors specific to the therapy session. Experimenter verbal feedback was gradually faded until therapists were providing their own critiques of the session with minimal comment from the experimenters.

Post Feedback Condition. During this period individual sessions were videotaped, and experimenters recorded behaviors. Therapists were given no feedback and did not view tapes of their sessions.

Results

Therapist A and Child A. Interobserver reliability for Therapist A and Child A was at a mean of 96% (denominators were equivalent across sessions for all means given). The mean for reliability over time was 95%. In Figure 1 the proportion of correct therapist-administered consequences

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Insert Figure 1 about here

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and the proportion of the child's correct responses are plotted against days. It can be seen that during baseline (Panel I) appropriate therapist behavior was very low (she administered no food consequences and the mean

for correct social consequences was .12), and this is also reflected in the baseline measures of the child's responding (Panel I) which averaged .04 correct responses per session. Although she had received previous instruction in behavior modification techniques this therapist was using no food consequences during baseline, and was praising a very high proportion of inappropriate responses. Upon initiation of the feedback condition (Panel II) the proportion of correct consequation increased markedly over time to a mean of .74 for food and a mean of .75 for praise. Child behaviors indicate a less dramatic but nonetheless considerable increase in proportion of correct responses. The child's mean proportion of correct responses was .36 per session. Arrows A, B, C, and D indicate points in time where new behaviors were added to the program. It can be noted that decreases in the child's correct proportion of responses followed the addition of each new behavior into the program. New response requirements were initiated in the middle of a session to avoid more serious disruption in a child's responding. Panel III shows that during the post-feedback condition the therapist's behavior was essentially maintained at a proportion which averages .99 for both social and food consequences. The child's behavior for this period also continued at a high proportion of correct responses (mean of .79 correct responses per session) and two new behaviors were added. The proportions of correct therapist consequation and proportion of correct child responses depicted in Figure 1 were transformed by means of arcsine transformations (Weiner, 1962) and a Pearson product moment correlation was computed. The correlation between arcsine transformations of appropriate therapist consequation and correct responses was $\underline{r} = .87$, $\underline{df} = 24$, $\underline{p} < .01$.

Therapist B, Child B_1 and Child B_2. Interobserver reliability for Therapist B and Children B_1 and B_2 was at a mean of 95%. The mean

reliability over time was 1.00. The proportion of appropriate therapist behavior and the proportion of correct child responses are plotted over days in Figure 2. During the baseline period (Panel I) means of appropriate

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Insert Figure 2 about here
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social attention and food administrations were .41 and .39 respectively. Child B_1's correct responses during this period averaged .13. During the feedback condition (Panel II) the therapist's behavior improved to an average of .80 for appropriate food administration, and .81 for appropriate praise administration. On the third day of the feedback condition the child was ill and did not emit any correct responses nor did he receive any food or praise. Child B_1's mean proportion of correct responses (.26) was double that displayed during baseline. In Panel III of this figure the therapist's correct consequation continued to improve to an average of .99 for both food and praise. Because Child B_1 had left the institution, Child B_2 was provided during the non-feedback condition to obtain a measure of Therapist B's behavior under the post-feedback condition. A Pearson product moment correlation between arcsine transformations of appropriate therapist consequation and the child's proportion of correct responses was $\underline{r} = .75$, $\underline{df} = 24$, $\underline{p} < .01$.

Therapist C and Child C. Reliability between observers was .96 and over time was 1.00 for sampled observations. Figure 3 shows the proportion of correct therapist consequation and the proportion of correct child responses plotted over days. In the baseline condition (Panel I) the therapist's average proportion of appropriate food and social consequation

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Insert Figure 3 about here
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was .20. The proportion of correct responses made by the child for this period was .29. Panel II shows the proportion of appropriate therapist consequation during the feedback condition. Improvement in therapist's behavior was very rapid with a mean of .99 appropriate food administrations and .98 appropriate praise administrations. The average of the child's correct responses was .58 during feedback condition. During the post-feedback condition (Panel III) the therapist's correct consequation was maintained at an average of 100%. The child's average for correct responses was .79 during this period, also an increase. A Pearson r computed on these data revealed a correlation of $r = .75$, $df = 13$, $p < .01$ between arcsine transformations of correct therapist consequation and the child's proportion of correct responses.

Negative Attention. Proportions of negative attention administered their children by Therapists A, B, and C are shown in Figure 4. Negative attention consisted of scolding or reprimanding the child, restraining him or physically forcing him to sit in his chair. The data reveal that by far the greatest

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Insert Figure 4 about here

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proportion of negative attention occurred during baseline. Incidence of negative attention was reduced to a very low level during the feedback condition for all three therapists. During the post-feedback condition, incidence of negative attention continued much lower than baseline phase, although data for Therapists B and C show some rise in proportion of negative attention occurring during this period. Therapist A's data show a continued decrease in negative attention during post-feedback.

Discussion

Results of Study I indicate that the video-feedback method was effective

in producing significant changes in nonprofessional therapists' administration of contingent primary and social reinforcement as compared to the baseline period. Baseline condition data indicate that instructions alone were not sufficient to produce appropriate and effective therapist behavior. The written instructions the therapists received described in detail the behaviors they were to model, the responses the child was required to perform, and the consequences the therapist was to administer. In addition each therapist had participated in at least one prior workshop on behavior modification and had been asked to read Patterson and Gullion's (1968) handbook. Under these conditions the therapists functioned at an inefficient level as evidenced by their low proportions of correct consequation during baseline. Other investigators (Ayllon and Azrin, 1964; Buel, 1970; Hopkins, 1968; Madsen, Becker and Thomas, 1968) have also found that instructions are not effective as the sole means of changing behavior. There must be some provision for supervision, feedback, and for reinforcement of the desired behavior once it is emitted.

During Study I no tangible reinforcement was provided to the therapists by the experimenters, no bonuses or promotions were contingent upon participation in the training session. During the feedback portion of the study therapists were shown the video tape replays and given praise from the experimenters for appropriate behaviors. Under these conditions, therapists' performances improved markedly. As the feedback portion of the study progressed, experimenter praise was faded while the therapists maintained their appropriate teaching behaviors. During the post-feedback section of the study the changes in therapists' behavior were maintained even when the feedback conditions were withdrawn. All three therapists maintained high proportions of correct consequation throughout this period, and in fact,

even increased their proportions of correct consequation.

Changes in the therapists' behavior were reflected in an increase in the children's proportions of correct responses. During the baseline phase minimal improvements were effected in the children's progress. It was not until the feedback portion of the study began that any striking positive changes in the children's behavior occurred. The correlation between the appropriateness of therapist and child behavior also reflect the above relationship.

As the therapists became more proficient in appropriate methods of controlling their sessions, proportions of negative attention were reduced to a very low level. As food and praise became contingent on correct responses, many of the children's extraneous responses which probably had been maintained by noncontingent reinforcement dropped out. Also contributing to this elimination of inappropriate responses was the alternative technique employed by the therapists, ignoring inappropriate behaviors.

Study II. Training Mothers to Tutor Their Own Children

The results of Study I established the efficacy of the feedback methods employed to produce and maintain changes in therapist behavior. Therefore, it was decided to test the feedback method in an actual training situation, that is, to use the feedback methods of Study I to teach persons having no previous experience in running individual behavior modification programs. An available source of untrained personnel consisted of mothers of some of the children enrolled at the Center. It was decided, therefore, to utilize the training procedures with mothers in behavior modification programs with their own children. Since the training system was employed with completely inexperienced personnel, the baseline period was omitted and a short

instructional period was instituted at the beginning of training. The approach of the end of the school year precluded a post-feedback condition in Study II.

Method

Subjects

The mothers and children used in this phase of the study are as follows:

Mother A and Child A. Mother A was in her twenties and had volunteered her services to the center as a classroom aide. Mother A had not attended college and like the two other mothers had no previous training in behavior modification. Child A, a 3-1/2 yr. old male, had been diagnosed as autistic and was nonverbal. He lacked imitative behaviors, and engaged in a series of self-stimulatory behaviors including rocking, twisting his hands, and staring off into space.

Mother B and Child B. Mother B was in her early forties and was also serving as a volunteer at the center. Child B was a 4 yr. old male who had been previously diagnosed as brain damaged and/or autistic. Child B was nonverbal and also had a repertoire of self-stimulatory behaviors, i.e., repetitive mouth noises, hand rubbing, and pounding with his hands repetitively on available objects.

Mother C and Child C. Mother C was in her early forties and served as a volunteer in a classroom at the training center. Child C, a 5 yr. old male, could speak, but was hyperactive, and responded to questions with a series of random, incorrect answers.

All children were engaged in ongoing individual training sessions at the center with therapists other than their mothers.

Apparatus

Apparatus used was the same as in Study I.

Procedure

The Experimenters first met with the mothers individually for approximately one-half hour per day for a period of one week. During this period the mothers were informed of the purposes, methods, and mechanics of the on-going programs for their respective children. Mothers were also provided with copies of a programmed text on behavior modification with young children (Patterson and Gullion, 1968), and were asked to read the book. No contingencies, however, were placed on their completing this book. Each mother was, however, trained individually in the mechanics of running an individual behavior modification training session through means of role playing and by viewing and critiquing previously recorded videotapes of other therapists conducting individual sessions.

Mothers were provided with the training center's programs for their respective children. Mother A's child was on an imitation program. The purpose of this program was to gain imitative control over motor behaviors. The first part of this program was designed to gain control over eye contact (attending) between the child and the therapist. Then, imitation of gross motor behaviors was programmed, e.g., closing doors, pushing chairs, and picking up objects. Finally, imitative control of finer motor movements was taught, e.g., tapping the table, and hand clapping. Consequation for this child consisted of Cheerios paired with appropriate social praise by the mother.

Child B was on a similar program. However, he had advanced to the fine imitation portion of the imitation program. Behaviors consisted of touching his own nose and ear, tapping the table, touching his mouth, and touching his tongue to his upper lip. Consequation for this child consisted of a variety of foods including canned baby fruit, dry cereal, potato chips,

and portions of his lunch all paired with appropriate praise from his mother.

Child C was on a color identification and labeling program which included the recognition and correct naming of various colors. For his correct color naming responses, his mother gave him popcorn paired with appropriate praise.

Throughout these mothers' training they viewed video replays of their sessions immediately upon their completion. Experimenters viewed tapes with the mothers and provided praise for appropriate behaviors, ignored non-appropriate therapist behaviors, and instructed mothers in behavior modification techniques appropriate to the situation. Experimenter verbal feedback was gradually faded until mothers were providing their own critiques of the session with minimal comment from the experimenters.

Results

Mother A and Child A. As Figure 5 (Panel A) shows, Mother A maintained

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Insert Figure 5 about here

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a high level of correct consequation throughout the training period, with some variations in the early part. During the latter part of the training period her proportion of correct consequation was at 1.00. Panel B shows the proportion of correct child responses over days. The portion preceding arrow A indicates the eye contact program. The severe dip in the graph occurring at day seven was a consequence of the child's tantruming throughout most of the session. Arrow A indicates inclusion in the program of door closing, chair pushing, and picking up objects. Arrow B indicates incorporation of table tapping into the program and Arrow C indicates when hand clapping was instituted. When new behavioral requirements were added to the

program, there were concomitant temporary decreases in the proportion of correct responses emitted by the child.

Mother B and Child B. As Figure 6 shows, during the first part of the

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Insert Figure 6 about here
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training period Mother B maintained a relatively high proportion of correct consequation. There was a severe drop in proportion of the mother's appropriate responses during the latter part of the training session when the behavior "touching tongue to lips" was included (Arrow C, Panel B). During this time the child's proportion of correct responses also dropped markedly. Prior to the termination of the training period the mother's proportion of appropriate consequation improved as did the child's performance.

Mother C and Child C. Figure 7 shows the proportion of correct con-

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Insert Figure 7 about here
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sequation by Mother C (Panel A), and the proportion of the child's correct responses (Panel B). Mother C rapidly established a high level of correct administration of both praise and food, which she maintained throughout the balance of the training period. Child C's behavior also improved over the training period, and three new colors were added to the original three as indicated by arrows A, B, C respectively.

Discussion

The data indicate that the mothers established high proportions of correct consequation within a very few sessions, and that this behavior was maintained throughout the training sessions. One exception was Mother B whose proportion of correct consequation decreased severely during the latter part of the sessions. Prior to this decrease "touching tongue to the

upper lip" was introduced. This was a very difficult response for Child B to imitate. During the shaping of this response a considerable proportion of praise and food was given for the child's inappropriate behavior, and the quality of the child's overall performance decreased markedly. During the last part of the training period the mother's proportion of appropriate consequation increased and, concomitantly, Child B's proportion of correct responses also increased. These data provide further evidence that improvements in therapist performance are reflected in the child's behavior.

During the training period each mother shaped three new behaviors as indicated by the individual programs. This provided the mothers the opportunity to define a target behavior and to shape these behaviors to criterion through the reinforcement of successive approximations of the correct response.

It was noted that during the feedback training program the mothers used very low frequencies of aversive control. Mother A used negative attention only three times during the training period. Mother B used negative attention 19 times during the training period, and Mother C used negative attention seven times during the training period.

Conclusions

Data obtained in these studies indicate that nonprofessionals, even those of limited education and advanced age, can be trained to become competent behavior change agents. The data obtained from the mothers in Study II, while merely suggestive, indicate that the feedback and training procedures described here can be used successfully with a wide range of nonprofessionals. A major point revealed by our investigation is that it does not suffice merely to present the nonprofessional therapist with a copy of a behavior modification program and an injunction to carry it out. Such

practices result in therapist's use of high proportions of inappropriate aversive controls and low proportions of correct consequation of appropriate child behavior.

Anyone expected to effect positive changes in the behavior of developmentally retarded children must be given explicit, detailed training and close scrutiny to insure that he is reliably following the required tutoring procedures. Under such circumstances nonprofessionals can maintain high performance standards even when the feedback-training program is withdrawn. At least they can do so when they are aware that they are still being observed, as was the case in this project.

The present study does not reveal whether therapist performance would be maintained when therapists know that observation of them has ceased. Nor do we know from this study whether the therapists used the techniques taught them in the experimental situation in their other interactions with the children at the treatment center. Knowing the discrimination capacity of humans, one suspects not. We need further research on the effects of monitoring therapist performance. But these preliminary data suggest that a system which provides intermittent monitoring and feedback regarding therapist performance may be effective in insuring high levels of correct therapist behavior.

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Footnote

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Figure Captions

Figure 1. Proportion of correct consequences administered by Therapist A (Panel A), and proportion of correct responses emitted by Child A (Panel B).

Figure 2. Proportion of correct consequences administered by Therapist B (Panel A), and proportion of correct responses emitted by Child B_1 (solid line, Panel B) and Child B_2 (broken line, Panel B).

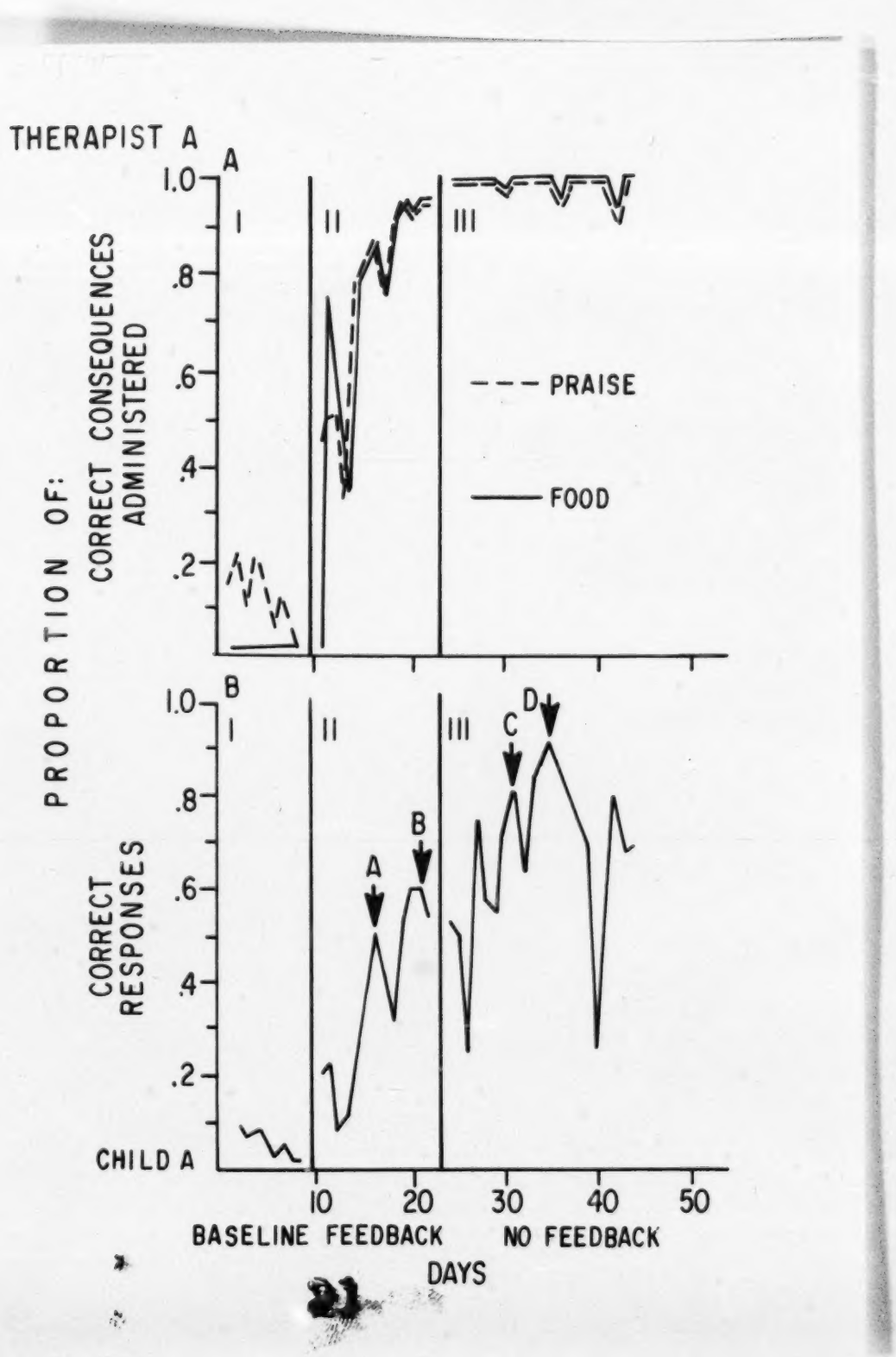
Figure 3. Proportion of correct consequences administered by Therapist C (Panel A), and proportion of correct responses emitted by Child C (Panel B).

Figure 4. Proportion of negative attention used by Therapists A, B, and C.

Figure 5. Proportion of correct consequences administered by Mother A (Panel A), and proportion of correct responses emitted by her child (Panel B).

Figure 6. Proportion of correct consequences administered by Mother B (Panel A), and proportion of correct responses emitted by her child (Panel B).

Figure 7. Proportion of correct consequences administered by Mother C (Panel A), and proportion of correct responses emitted by her child (Panel B).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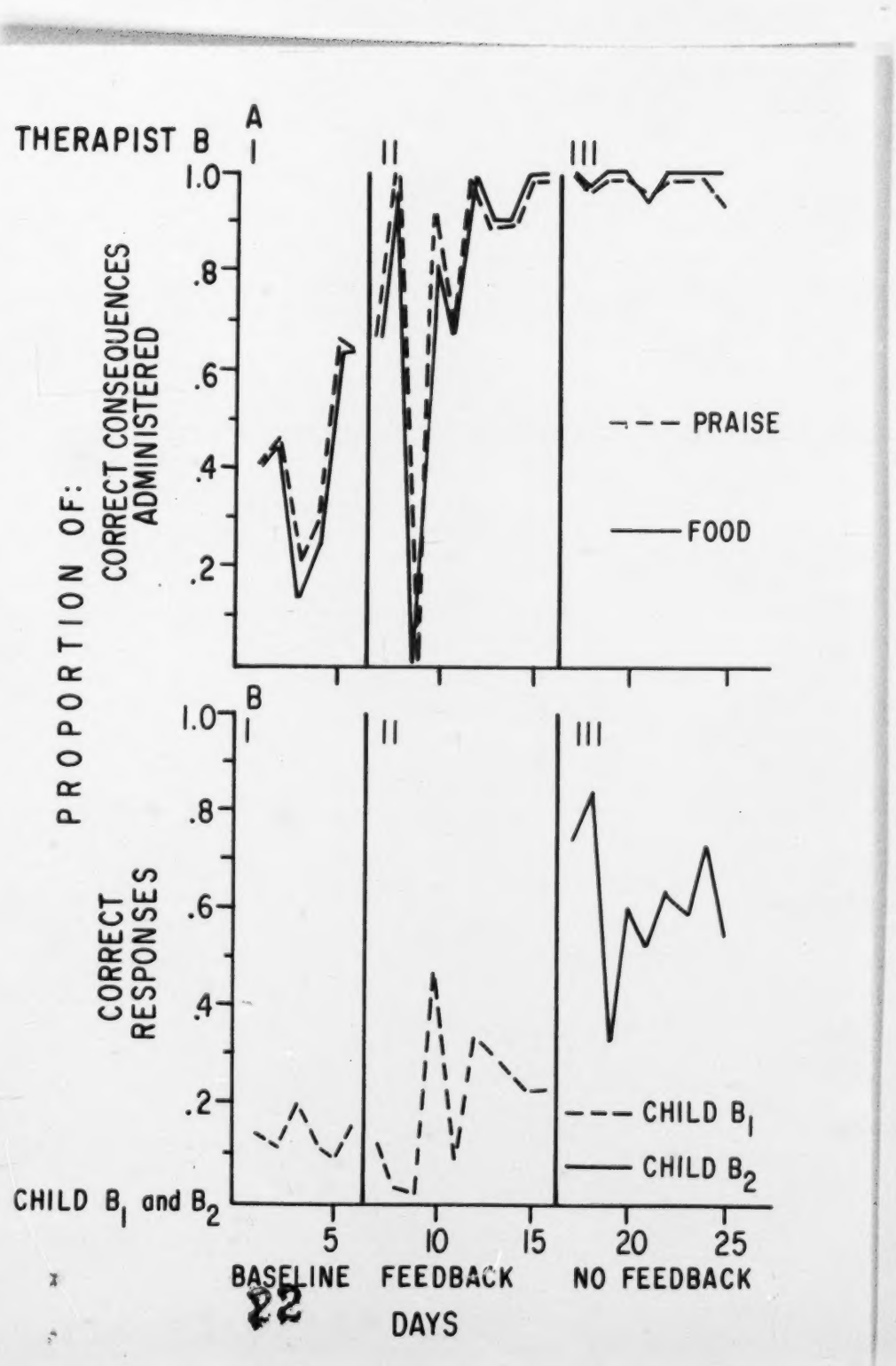
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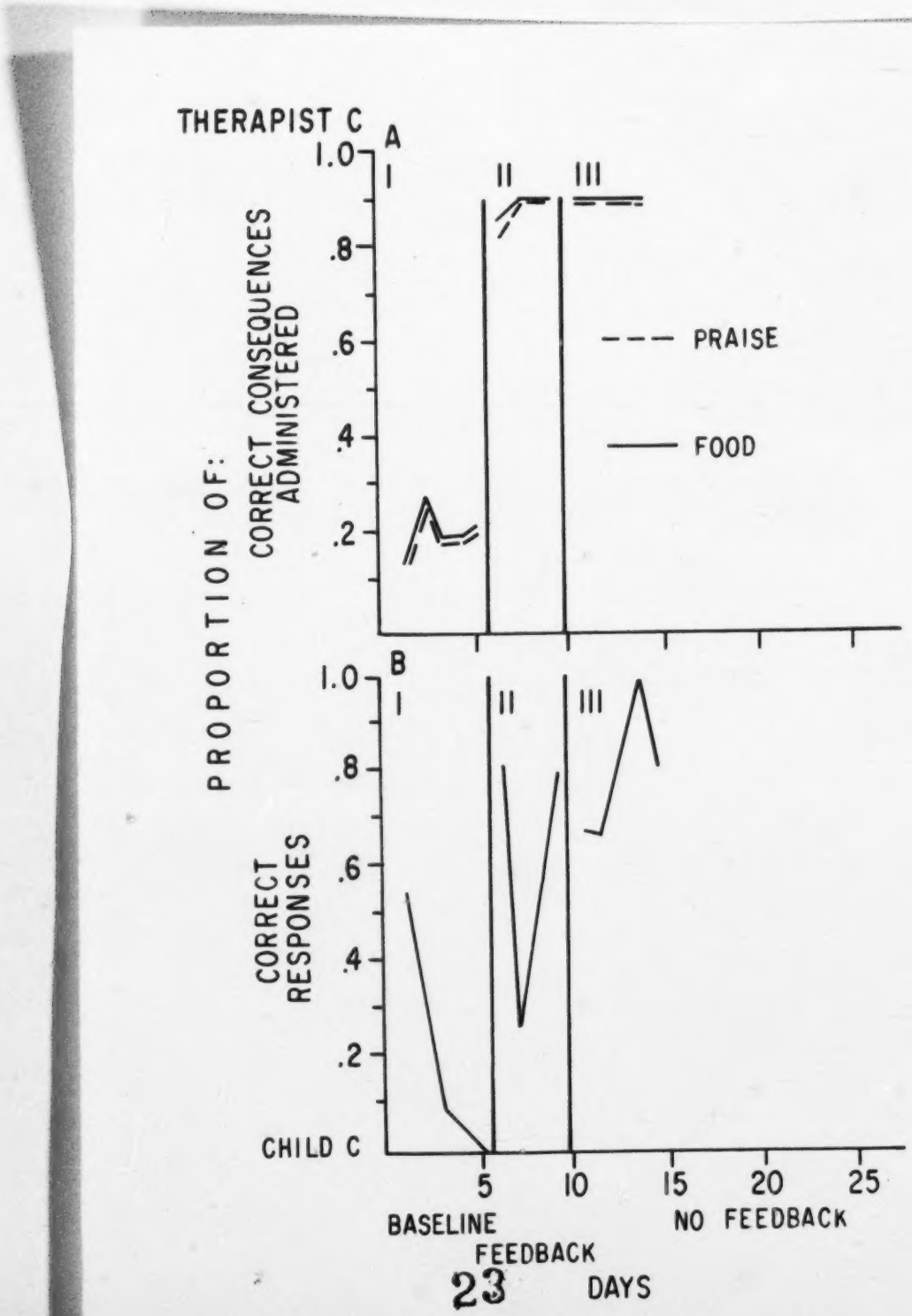
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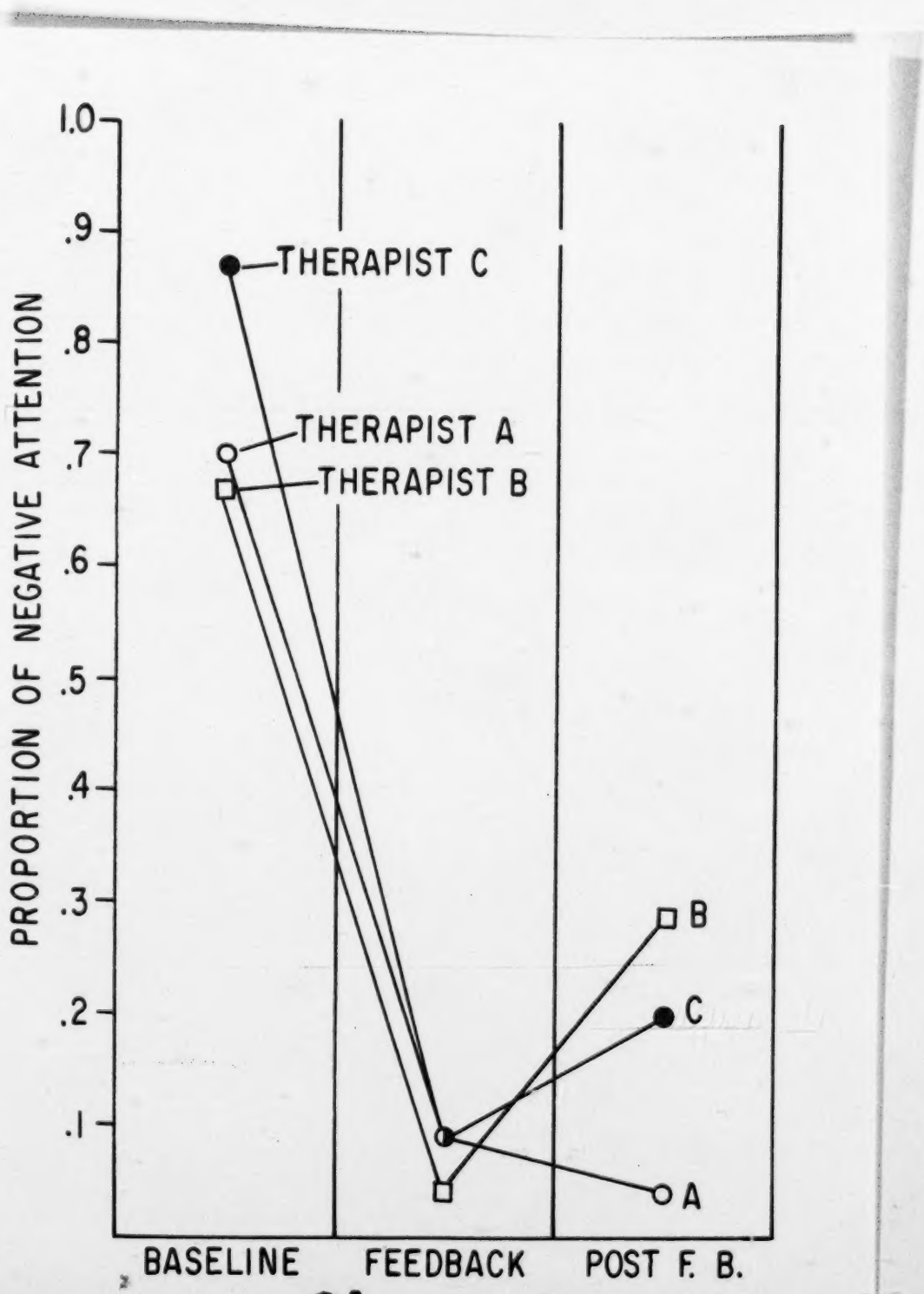
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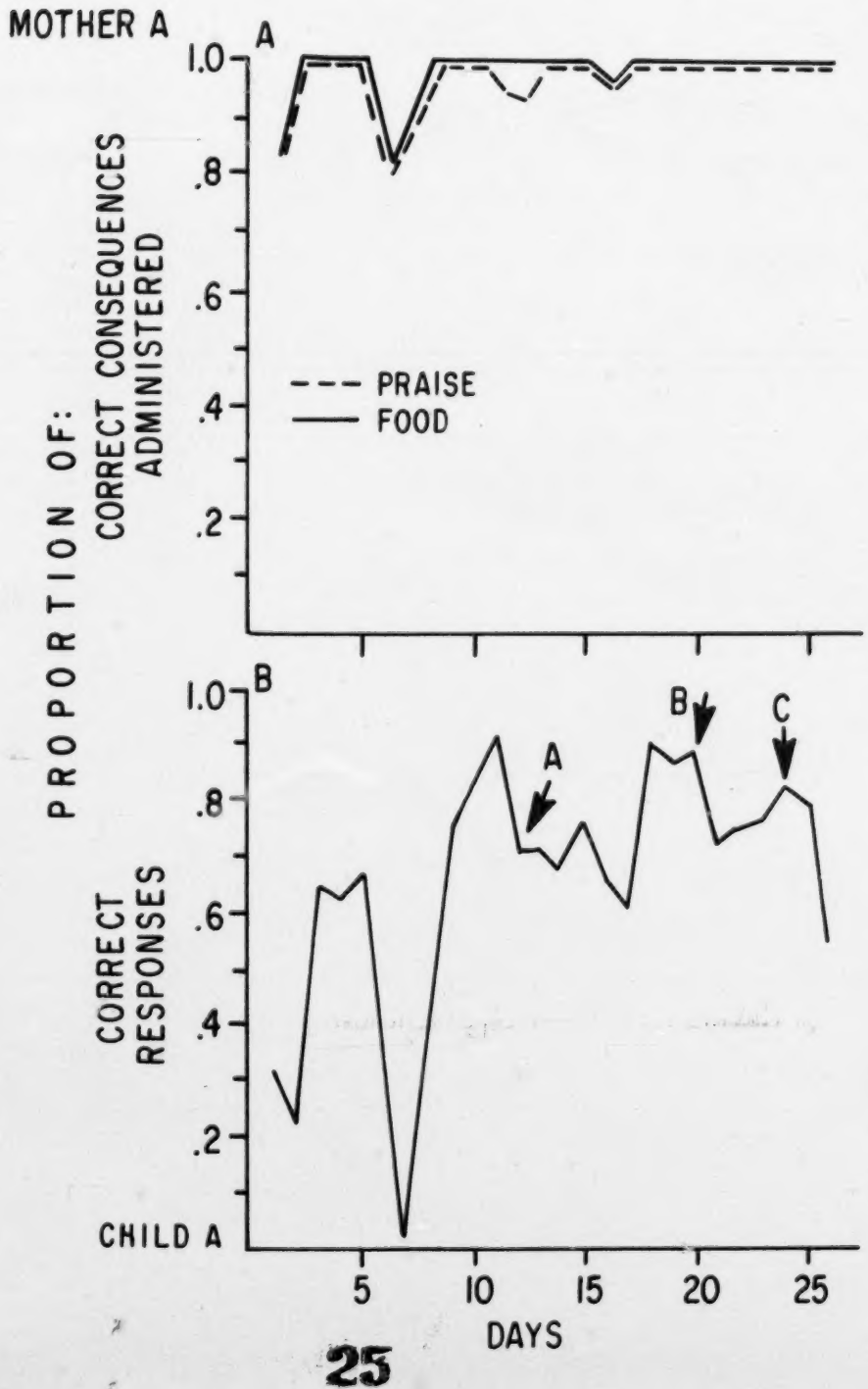
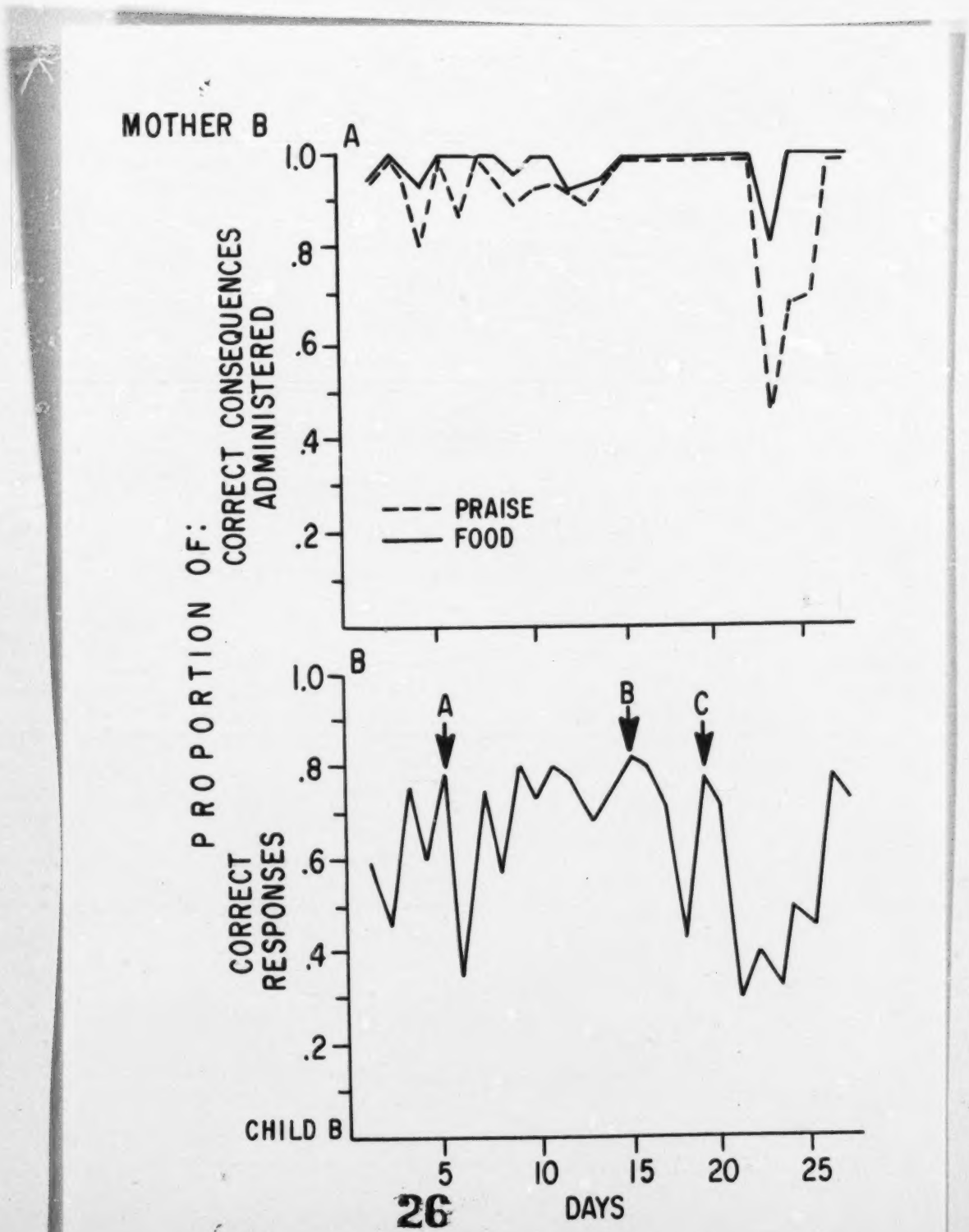
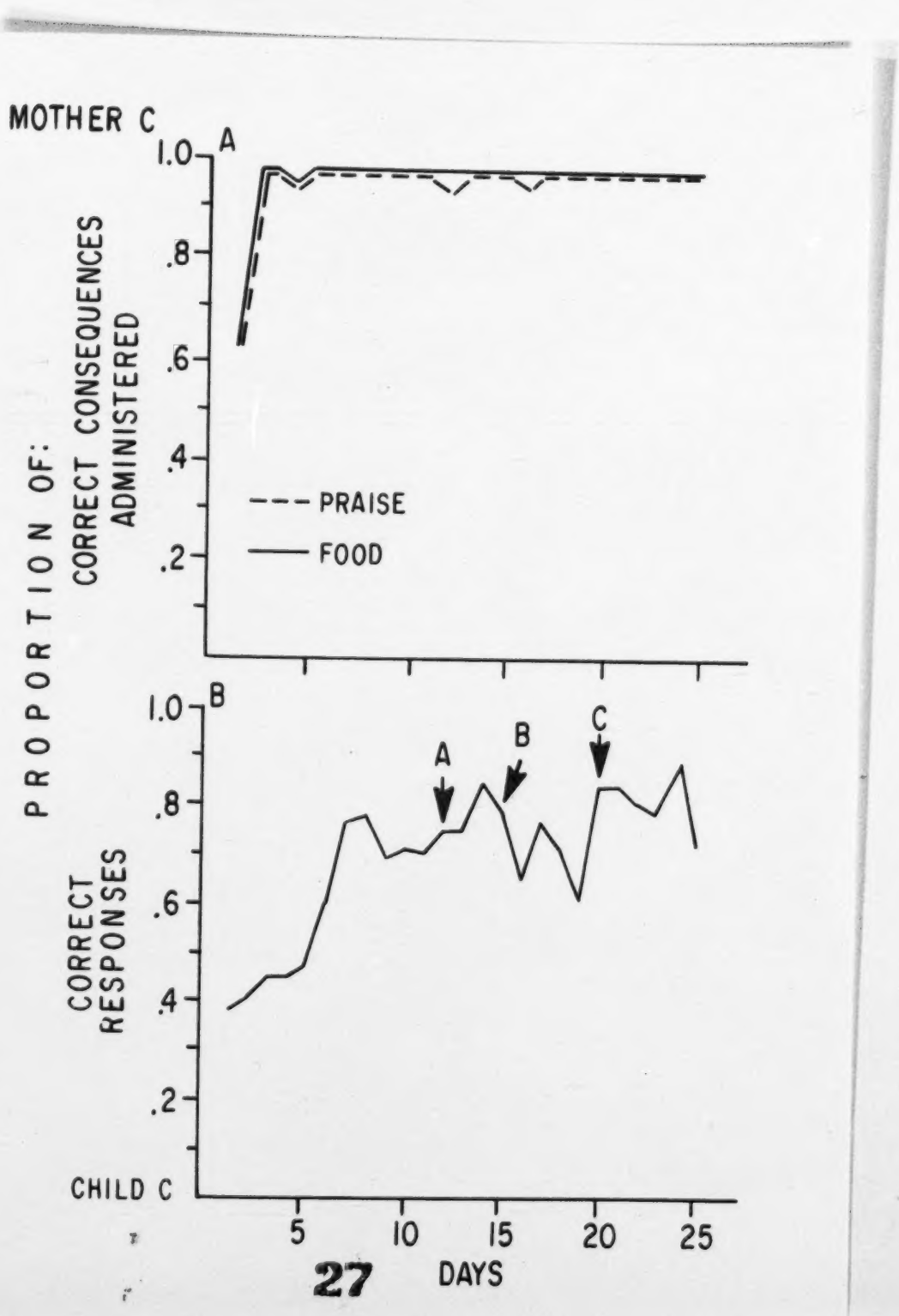
FEEDBACK
POST F. B.


MOTHER A
A
1.0
.8
.6
.4
.2
PROPORTION OF:
CORRECT CONSEQUENCES
ADMINISTERED
PRAISE
FOOD
B
1.0
.8
.6
.4
.2
CORRECT
RESPONSES
A
B
B
C
CHILD A
5
10
15
20
25
DAYS


MOTHER B
A
1.0
.8
.6
.4
.2
PROPORTION OF:
CORRECT CONSEQUENCES ADMINISTERED
PRAISE
FOOD
B
1.0
.8
.6
.4
.2
CORRECT RESPONSES
A
B
C
CHILD B
5
10
15
20
25
DAYS


MOTHER C
A
1.0
.8
.6
.4
.2
PROPORTION OF:
CORRECT CONSEQUENCES ADMINISTERED
PRAISE
FOOD
B
1.0
.8
.6
.4
.2
CORRECT RESPONSES
A
B
C
CHILD C
5
10
15
20
25
DAYS